



Why fast growing broadleaves?

– a study of forest owners' tree species choice
after storm damages in southern Sweden



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Abstract

The so called borealization of southern Sweden has resulted in several negative consequences such as a decline of biodiversity, a complete change of the landscape picture with decreased recreational and cultural values and increased risk for damages caused by storm and pests. Climate change is predicted to result in more unsuitable conditions for spruce which increases the risks for damages from storm and pests, with great economic losses for the individual forest owner and the whole society as a consequence.

Establishment of broadleaves can contribute to increase biodiversity, the recreational values in the landscape and the resistance to storms in the forests. Fast growing broadleaves are deemed as economic viable alternative to spruce plantations due to their high growth. In Sweden it is mainly hybrid aspen and poplar hybrids that are used and there is potential to increase establishment of these species. After the storm Gudrun in 2005 the Swedish Forest Agency made specific efforts to encourage and influence forest owners to plant other tree species than spruce. There were subsidies available for the re-establishment and many forest owners choose to plant fast growing broadleaves. The majority of the storm damaged sites were nevertheless replanted with spruce again. The aim with this study was to investigate why forest owners choose to plant hybrid aspen and poplar after the storm. Qualitative interviews were conducted with nine forest owners in Halland and Kronoberg counties during April and May 2015. The most important factors for the choice to plant fast growing broadleaves turned out to be the subsidies covering the extra costs for the regeneration, recommendations from forest officers at SFA, a wish to increase the amount of broadleaves on the estate, curiosity to other tree species and a will to spread the risks for the future. The biggest problems with the establishments were browsing damages and plant mortality. The economic expectations on the stands were low and there were uncertainties related to the management of the stands and the future demand for the species. Most of the informants choose to plant small areas with fast growing broadleaves, because they experienced the risk too high. The overall knowledge about the species needs to be improved to facilitate for forest owners to choose fast growing broadleaves, also the accessibility and quality of plant material. In addition it is important to better consider the forest owners' personal goals and objectives with the forest when planning the forest management.

Key words: NIPF owners, forest management, decision making, advisory services, the Swedish Forest Agency, Southern Swedish Forest Owners' Association

Sammanfattning

Den så kallade granifieringen av södra Sverige har resulterat i flera negativa konsekvenser så som minskad biodiversitet, förändrad landskapsbild med lägre rekreativvärden samt ökad risk för stormskador och angrepp av skadegörare. Klimatförändringarna förväntas leda till sämre förhållande för gran på vissa marker vilket ökar riskerna för skador från storm samt olika skadegörare med stora ekonomiska förluster både för den enskilde skogsägaren och hela samhället som följd. Ökad plantering av lövträd kan bidra till att höja biodiversitet, rekreativvärdet i landskapet och stormtåligheten i skogarna.

Snabbväxande lövträd anses vara ett ekonomiskt lönsamt alternativ till granplanteringar tack vare den höga tillväxten. I Sverige är det främst hybridasp och olika poppelhybrider som används och det finns potential för att öka etableringen av dessa arter. Efter stormen Gudrun 2005 fanns det möjlighet att få bidrag för återplantering och ett mål med dessa var att få fler skogsägare att plantera andra trädslag än gran för att sprida riskerna för framtida stormskador. Skogsstyrelsen gjorde särskilda insatser för att uppmuntra skogsägarna till detta och många skogsägare valde att plantera hybridasp och poppel. Dock blev majoriteten av de stormdrabbade områdena återplanterade med gran. Syftet med den här studien var att undersöka varför skogsägare valde att plantera hybridasp och poppel efter stormen. Kvalitativa intervjuer genomfördes tillsammans med nio skogsägare med fastigheter i Kronoberg och Halland under april till juni 2015. De viktigaste faktorerna för skogsägarnas val att plantera hybridasp och poppel visade sig vara bidragen som täckte de ökade kostnaderna för förnygringen, rekommendationer från Skogsstyrelsens rådgivare, en önskan att öka lövandelen på fastigheten, en nyfikenhet för alternativa trädslag samt viljan att sprida riskerna inför framtiden. De största problemen med planteringarna var relaterade till betesskador och plantdöd. Dessutom var de ekonomiska förväntningarna på bestånden låga och det fanns osäkerheter relaterade till skötsel och framtida efterfrågan av trädslagen. De flesta valde att plantera små arealer av snabbväxande lövträd, antagligen för att risken upplevdes för stor. I medel planterade informanterna 20 % av sin stormfällida areal med snabbväxande trädslag. Att plantera gran igen på majoriteten av marken upplevdes som en mindre risk. Kunskapen om snabbväxande lövträd behöver bli större generellt för att skogsägare ska våga välja dessa, likaså behöver utbudet och kvaliteten på plantmaterial förbättras. Utöver det är det viktigt att skogsrådgivaren tar hänsyn till skogsägarens individuella mål med skogsbruket i valet av trädslag.

Nyckelord: enskilda skogsägare, skogsskötsel, beslutsprocesser, skoglig rådgivning, Skogsstyrelsen, Södra

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1. Introduction

1.1 Background

The forests in southern Sweden have gone through a major transformation during the last century resulting in the so called borealization of the region (Lindbladh et al, 2014a). Norway spruce (*Picea abies*, hereafter spruce) has been increasing on the expense of mixed or broadleaved forests due to climatic, biotic and anthropogenic factors. The establishment of spruce plantations, from the middle of the 20th century, has however been the strongest driver for the transformation (Fredh et al, 2012; Lindbladh et al, 2014a). The value of timber increased in the beginning of the 20th century, resulting in a more structured and rational type of silviculture (Lindbladh et al, 2014a). Spruce became popular for timber production due to several factors; relative simple management, high growth thus making it suitable for shortening the rotations, early economic yield from thinnings and relatively low susceptibility to browsing from ungulates (Felton et al, 2010a). With the increase of spruce monocultures followed a well-developed spruce-based timber and pulp industry of major economic importance (Holgén & Bostedt, 2004). Today the forest land in southern Sweden consists of approximately 50 % spruce (Skogsstyrelsen, 2014a).

From an ecological, recreational and economic point of view, several negative effects from spruce plantations have been concluded by scientists and experts. Firstly, the species' sensitivity to wind and rot when planted on unsuitable sites has resulted in great economic losses after large-scale storm damages during the last decade (Valinger & Fridman 2011; Lidskog & Sjödin 2014). Spruce forests in general and in particular old and newly thinned stands, have shown to suffer greater wind damages than for example mixed or deciduous stands (Valinger & Fridman, 2011). The borealization has resulted in a total change of the landscape picture in southern Sweden with decreased recreational and cultural values as a consequence. Spruce plantations are often dark, dense and even aged, whilst the public are stated to appreciate other attributes in a forest; openness, easy to move through, visual appearance and free sight (Skogsstyrelsen, 2013a). A study made by Andersson & Rydberg (2005) tells us that the public primarily look at the forest as a resource for recreation and experience, rather than a resource for production. Forests are important for a high life quality. Moreover, Jensen & Koch (2010) stated that forests consisting of deciduous trees are more preferred for recreational purposes. In addition, a decline of biodiversity has been concluded due to the borealization (Felton et al, 2010a; Berg et al, 1994; Nilsson et al, 2006).

Another important aspect is that the climate change is predicted to result in even more unfavourable conditions for spruce in southern Sweden with milder winters, altered precipitation and more frequent and extreme weather events (Felton et al, 2010b; Lindner et al, 2014) with risk for greater pest and storm damages as a result. In summary; spruce has been of great economic importance for individual forest owners and the forest industry and continuous to be so. However, damages from wind, pests and rot should be considered as economic risks and therefore alternatives need to be discussed and investigated. Increased establishment of deciduous tree species is one way to avoid several of the negative effects listed above. It can be in form of mixed stands together with conifers or pure broadleaved stands. One alternative is the use of slow growing

broadleaves such as oak and beech and one other is the establishment of fast growing hybrids of deciduous tree species. This study focus on the latter and in particular (*Populus x wettsteinii* Hämet-Ahti, hereafter hybrid aspen) and poplar hybrids as they are the species used in Sweden.

Fast growing broadleaves in southern Sweden

Hybrids of aspen and poplar are popular for use in short rotation wood production in many countries, including Sweden, due to their high growth (Tullus et al, 2007). The interest for hybrid aspen in Sweden has come in waves, with a rise in the 1940's when the demand for timber for producing matches was high, followed by a decline some twenty years later (Engerup, 2011). The species are mainly associated with establishment on former agricultural land but they also have high potential for production on forest land. Increased establishment of these species would be interesting for several reasons. For instance, they have been deemed as economical viable alternative to spruce plantations due to their high growth. When planted on suitable sites the production and hence the profitability can be as high as or even higher than spruce (Rytter et al, 2012). In addition, broadleaves might have higher ability to withstand storms. Both poplar and hybrid aspen are suitable for production of bioenergy, thus making them important in the efforts to move away from fossil fuels. The high growth of the species makes it possible to concentrate biomass production on smaller areas, thus making it possible to release areas for other usages, recreation for instance.

The growth of hybrid aspen has increased steadily since the introduction of the species in Sweden, as improved plant material has been developed and today it is possible to achieve up to 25 m³ per ha and year under right conditions and by using the best plant material. In addition, research indicates that hybrid aspen might be more resistant to pest attacks, e.g. *Melampsora pinitorqua*, than the native aspen (*Populus tremula*) (Skogsstyrelsen, 2008). Hybrid aspen is similar to the native aspen, in both timber characteristics and appearance (Rytter et al, 2012), thus making the hybrid a suitable alternative for short rotation production of timber, pulp and bioenergy. Old aspens are important in the landscape as substrate for many wood living species (Esseen et al, 1997) and hybrid aspen is suitable for this purpose as well.

Most of the previous research of hybrid aspen and poplar has been conducted on former agricultural land and there is thus a knowledge gap when it comes to establishment and management on forest land (Engerup, 2011). At the same time there is more knowledge and experience about management of hybrid aspen in Sweden compared to poplar which might make it more suitable to promote for forest owners. Important to consider when establishing fast growing broadleaves is the need of fencing due to high browsing pressure which results in increased establishment costs (Rytter et al, 2012; Löf et al, 2010). Fencing can be negative from an exclusionary aspect, i.e. both game and humans will have limited access to the area. A positive effect from fencing is that a wide range of broadleaves, usually heavily browsed, have the chance to establish within the fence. The poplar material used today is a clone mixture of *P. trichocarpa* hybrids. They have very high demands on water and nutrients, but on the other hand they are considered not as susceptible for browsing as hybrid aspen and it is even possible to succeed the establishment without

fencing (Engerup, 2011). However, once established at a proper site, production can be as high as 30m³ per ha and year (Rytter, 2005).

The storm 2005

In the winter 2005, the severe storm called Gudrun hit southern Sweden. About 50 000 forest owners got affected by storm and in total 75 million m³ timber blew down over one night, corresponding to approximately one year of total harvest in Sweden (Skogsstyrelsen, 2013b). The storm in one way became an eye opener for both forest owners and the rest of the forest sector. It was concluded that spruce forests were the worst affected and thus the vulnerability of spruce plantations started to be discussed. There was a worry that the great amount of forest owners affected by the storm would not be able to handle all the replantation and therefore subsidies became available to support them economically (Skogsstyrelsen, 2013b). The Swedish Forest Agency (SFA) was managing the subsidies and thus had the chance to meet forest owners out in the field and visit the damaged sites. After the storm, researchers and experts started to recommend establishment of other tree species than spruce, e.g. mixed or deciduous forests. SFA decided to act in accordance with these recommendations and had as a clear goal to influence and encourage forest owners to plant other tree species than spruce and especially broadleaves.

There were two types of subsidies; one for traditional reforestation of spruce or other conifers and the other type of subsidy, reestablishment with broadleaves for increased diversity which requires fencing, was formed to favour planting of tree species that normally are disfavoured in Swedish forestry today (Skogsstyrelsen, 2013b). Establishment of such species requires fencing due to high browsing pressure which results in increased establishment costs thus making them less preferred among forest owners. Fast growing broadleaves are included in this group. For this type of subsidies, establishment of a fence with specific height and material was required. Initially, the minimum size of the area was 2 hectares but SFA decided to change that to 1 hectare when they realised that there were several suitable areas smaller than 2 hectares. The subsidies were formed in a way that the regeneration costs would be the same, about 10 000 SEK/ha, irrespective the tree species. The subsidy varied between 3000-36 000 SEK/ha depending on the tree species and size and shape of the site. The idea with the subsidies was that forest owners would not hesitate to choose other tree species than spruce due to the higher establishment costs.

The goal of the SFA was that 10 000 hectares would be replanted with deciduous trees and 80 000 hectares with spruce. However, the final result was that 88 000 hectares ended up being replanted with spruce and only 3000 hectares with broadleaves (Skogsstyrelsen, 2013b). 1400 hectares were planted with hybrid aspen and 225 hectares with poplar. In total, spruce accounted for more than 95 % of all forest being established on damaged sites after the storm (Lidskog & Sjödin, 2014). Studies made after the storm pointed at an increased awareness concerning storm damages among private forest owners compared to before the storm (Ingemarsson et al, 2006b). So why did not forest owners plant more broadleaves but continued to plant storm sensitive spruce? Lidskog & Sjödin (2014) found several possible explaining factors why forest owners choose to plant spruce again despite the risk for future storm damages; lack of knowledge about alternative tree species such as hybrid aspen, tradition as a strong factor when choosing tree species, a fear of extra costs

related to the establishment thus resulting in a lower total net income, fear of the species not being suitable on the soils and more sensitive to pest attacks.

Forest ownership structure

The forest ownership structure in Sweden is characterized by a large proportion of private ownership, especially non-industrial private forest owners (NIPF owners). Half of the productive forest area is owned by this group and they control about 60 % of the total timber production (Ingemarsson et al, 2006a). The forest sector in Sweden is of great importance for the economy, in 2011 the total export value accounted for SEK 127 billion (Skogsstyrelsen, 2014b), making this group of forest owners of significant importance for the Swedish economy. In southern Sweden where this study was conducted, NIPF owners together own about 78 % of the total forest area (Skogsstyrelsen, 2014c). Thus, decisions made within this group of owners will have social, ecological and economic impacts. At the same time, this group of forest owners is going through a transformation, heading towards a more heterogeneous group composition holding a wide range of goals and objectives (Eggers, 2014; Törnqvist, 1995). For instance, NIPF owners are less economic dependent on the incomes from their forest today (Ingemarsson et al, 2006a). Many NIPF owners hold strong emotional ties to their forest and want to manage it in a way so that future generations can enjoy it, as well as manage it for recreational purposes (Eggers, 2014; Törnqvist, 1995).

Swedish forest legislation

The present Forestry act was implemented 1994, with a clear aim to liberalize forest management and simplify for NIPF owners to fulfil different types of goals and objectives, as well as to equalize biodiversity objectives with timber production ditto (Nylund, 2010). This can be compared with the previous Forestry act that was more production oriented, promoting conversion of slow-growing deciduous forest and pasture land to conifer forests and that contained more explicit requirements such as obligations to make pre-commercial thinning (Blennow, 2008). NIPF owners today thus have great possibilities to influence biodiversity, tree species composition as well as the overall landscape picture. With this increased freedom for the forest owners in addition with a change in their values and objectives, the new legislation was expected to result in a greater variation in tree species composition and management system (Appelstrand, 2007). The fact is however that establishment of other tree species than spruce only has increased marginally the last decades, mainly due to limited knowledge and higher establishment costs compared to spruce (Löf et al, 2010).

Advisory organizations

The Swedish Forest Agency (SFA) is responsible for implementation and follow up of the Swedish Forest Act. In addition, forest officers at SFA provide forest owners with information, education and consultation, creates green management plans and works to raise awareness of different values and opinions within the forest sector (Skogsstyrelsen, 2015). The work made by SFA is based on the latest Forestry Act from 1993 where the environmental and production goals were equalized. Except using advisory and informative

ways to influence forest owners in their decision making, SFA also works with economic instruments, e.g. subsidies. For instance the subsidies available after the storm 2005.

Södra. In Sweden there are four major forest owners' associations active from north to south. Almost half of the NIPF owners in Sweden are a member of one of the organizations and thus the forest owners' associations in Sweden are the main intermediates between the wood supplier and the industry. Södra is organising NIPF owners in southern Sweden and is the largest one. With more than 50 000 individual forest owners as members and several saw and pulp mills they are an important and influential actor in the forest sector. Södras' members own approximately 50 % of the total forest area where Södra is active as timber buyer (Fermvik, 2008). The main idea with the organization is to promote the profit of all member's forestry as well as to provide them with service and consultancy. Södras' equivalent to forest officers working a SFA are called inspectors and their main task is to purchase timber. In addition, Södra owns industries; several pulp and saw mills and production of different wood products and bioenergy (Södra Skogsägarna, 2013).

Research has shown that Södra is considered as an organization to rely on during hard times, this was certainly clear during and after the storm Gudrun (Guillén et al, 2015). The same study could though point at the trust between NIPF owners and the organization should have been affected by some of Södras' activities within the forest industry, i.e. that they prioritize their own industries and businesses abroad rather than the interest of their members. NIPF's social networks, relations and trust within the forest sector have been subject for increased interest and are today a quite well researched area. For instance, studies can show that membership in a forest owner's association is an important factor influencing forest owner's management decisions (Eggers, 2014).

1.2 Aims and research questions

Several studies have been done investigating the behaviour, decision making processes and risk management of NIPF owners (Blennow, 2008; Blennow & Sallnäs, 2002; Lidskog & Sjödin, 2014; Ingemarsson et al, 2006a). By studying this important group of forest owners we can get a deeper understanding what factors are influencing them in their daily decision making and what is driving them in their forest management. This knowledge is important in the development of policy instruments and strategies aiming to achieve certain goals and objectives that are prioritized by society, e.g. increase the proportion of broadleaves in the landscape.

Many forest owners choose to plant other tree species than spruce, including fast growing broadleaves, after the storm Gudrun. However, the goal set by SFA was by far not met and the result was that a majority in fact choose to plant spruce again. In order to be able to increase establishment of other tree species than spruce in the future, it is thus important to investigate the factors which influenced the forest owners in their decision.

Therefore, this study aims at investigate the attitudes and opinions about fast growing broadleaves among the NIPF owners that choose to plant fast growing broadleaves after the storm Gudrun, and the factors that influenced them in their choice.

The following research questions will be sought answers in order to reach that aim;

- Why did NIPF owners choose to plant fast growing tree species in the aftermath of the storm Gudrun?
- What was different in the decision making situation after the storm in comparison to a normal situation when deciding upon tree species for regeneration?
- What alternatives did they consider?
- How did NIPF owners inform themselves about the alternatives for regeneration after the storm?
- Was and is there sufficient information about fast growing broadleaves available?
- What expectations did the forest owners have on fast growing broadleaves and what was the overall result of the establishments?
- Have there been any problems associated to their establishment of hybrid aspen/poplar and what can be done to increase and facilitate establishment of fast growing broadleaves?

2. Theoretical underpinnings

2.1 General decision-making

Humans make decisions every day, at different levels and of varying importance. Making decisions, i.e. choosing between different alternatives is about finding the best path of action, or an alternative that is satisfactory enough and which aims to achieve the decision makers' goals and objectives. Decision theory has been a subject for research since the middle of the 20th century and is used within multiple academic disciplines (Hansson, 1994). In the field of decision theory it is a fundamental presumption that the decision maker has alternatives to choose from, hence the decisions are made non-randomly and based on rationality (Hansson, 1994). Decision making is thus complicated since several options need to be considered and the decision maker needs to have sufficient knowledge about the options to be able to make rational decisions aiming to fulfil individual goals and objectives (Perkins, 2009).

Most people have probably asked themselves more than one time after experiencing the result of their decision why they choose to do that one thing in a specific way, why that decision was made and so on. This is because people many times tend to make decisions impulsively and impressionistically, rather than using existing knowledge, evidence and past experiences as a base for the decision, which might result in the decision being irrational (Perkins, 2009). Decision making also includes dealing with uncertainties. Ideally when decisions are made, there are several alternatives available with sufficient information about the consequences and outcomes of each and every alternative. The decision maker thus needs to consider the risks associated with the possible alternatives, together with the possible outcomes of each alternative and eventually choose the best possible alternative. For the decision maker to be able to manage a risk, he or she has to be aware of it and to actively choose between different alternatives in order to reduce the risk, if the stakes are considered high enough. As always when decisions are made, it includes trade-offs between several objectives.

In rational decision making it is assumed that every risk-averse individual will act according to the MAXIMIN decision rule, where every available alternative is analysed carefully and with aspect to the minimal expected utility and the one with the largest minimal utility is chosen (Blennow & Sallnäs, 2002). When the epistemic uncertainty is high, i.e. the decision maker is unaware about the outcomes of every possible alternative, it is difficult or even impossible to make rational decisions based on risk analyses. This will instead increase the risk of decisions largely based on the decision makers' personal beliefs and values (Blennow & Sallnäs, 2002). In addition, usually when decisions are made there is a lack of resources and time that will restrain the analysing process. Instead, experience is many times used as decision support, i.e. to do things the way it traditionally has been done (Wallin & Gärdenfors, 2000). Humans generally tend to keep with previous decisions and patterns of action; this can also be viewed in forestry when tree species choice is made for instance. However, a crises or extreme event, such as the storm 2005, may be an opportunity to rethink previous habits and way of thinking (Lidskog & Sjödin, 2014).

2.2 Decision-making in forestry

To own and manage a forest includes making decisions, at different levels and of varying importance. Examples of decisions NIPF owners have to deal with are the choice of tree species and management system, when or where to harvest, which objective is aimed for with a certain measure for example. Decision making in general and in forestry in particular, includes dealing with uncertainties, i.e. risks. The relative long rotations in forest management result in greater uncertainty for future events. Climate change, storms, changing markets and future demands, pest attacks etc. are all hazards a NIPF owner has to consider in the daily decision making. For the decision maker to be willing and able to take risk reducing measures, he/she needs to be aware of the risks and at the same time consider the stakes high enough to execute the measures.

There are several factors to be considered that might influence the decision making. For instance, NIPF owners often manage their forests for multiple purposes where more than one objective is aimed for, e.g. timber production and recreation (Andersson & Gong, 2010). This may result in value uncertainty, i.e. it can be difficult to predict which of the objectives will be prioritized in the decision making (Blennow & Sallnäs, 2006). Due to this, miss-matches between NIPF owners' expressed values and objectives and their actual behaviour and activities made in forest management may occur. Studies have shown for instance that forest owners whom did not rank timber production as an important objective anyway planned to thin their forests (Dhubháin et al, 2010). Value uncertainty complicates active risk management because well-defined and prioritized goals are important ingredients to succeed (Blennow, 2008).

Furthermore, knowledge uncertainty may occur and prevent rational decisions aiming to fulfil specific goals and objectives. When this is the case, the decision maker is lacking knowledge about different possible alternatives and this is in itself considered to be a risk (Gärdenfors & Sahlin, 1982). For instance, in Sweden, there is generally high knowledge about managing conifer stands for high timber production within the clear-felling system, whilst there is a shortage of knowledge and experience of alternative management systems than the clear-cutting system and the management of non-conifer species (Blennow, 2008). However, several factors might result in decisions based on individual beliefs and values even when knowledge is high and uncertainties are low; lack of time and resources, distrust in science and forest consultants etc.

NIPF owners in Sweden are concluded to be risk averse (Lönnstedt & Svensson, 2000) and they have ranked wind damages as one of the major threats to their forests from an economic point of view (Blennow & Sallnäs, 2002). A majority of the forest owners in the same study considered themselves taking risk reducing measures in their management of the forests whilst 35 % were unaware if they did. Blennow (2008) stresses the lack of active risk management in Swedish forestry and (Blennow & Sallnäs, 2006) are pointing at the importance of it for achievement of sustainable forestry as well as for NIPF owners to be able to reach their individual goals and objectives. But the forest owner is not an isolated island, multiple stakeholders in the forest sector; the industry, the public, environmental organizations etc. with different interests and goals, many times conflicting, wants to influence the decision making of NIPF owners in accordance with their own interests.

2.3 The role of advisors in forestry decision-making

The common decision support for a NIPF owner is a forest management plan, created by a forest officer, usually working at SFA or a forest owners association, e.g. Södra (Brukas & Sallnäs, 2012). This put the forest officers in a unique position with possibilities to influence the forest owners as they are providing them with knowledge and support for their decisions. They are thus partly responsible for the achievement of NIPF owners' goals and objectives. However the plans are made under time pressure, without spending much or no time at all with the forest owner (Brukas & Sallnäs, 2012). Sonesson et al, (2005) are pointing at the need of greater consideration to the individual forest owners' goals and objectives during the planning process of the forests. In their study they found a desire for more individualized management plans among the forest owners, i.e. improved consideration to the NIPF owners' personal goals and objectives.

Studies have shown that NIPF owners generally have high trust in forest officers from different organizations, and regularly request advices and consultancy from them in decision making processes (Blennow, 2008). At the same time scepticism towards forest advisors exists among NIPF owners (Linné, 2011). Linné mentions several factors influencing this, for example advices and consultancy in forestry are shifting many times with short intervals, thus making it difficult for forest owners to rely on the advices and what is actually the best thing to do. In addition, the way forest officers presents their advices have in some cases been experienced as ignorant and with a feeling that they know best and have all the sufficient knowledge about forest management. Follo (2011) stresses influence from forest consultants in the decision making of NIPF owners as an important factor in a study made in Norway. Particularly among female forest owners there was an expressed lack of sufficient knowledge and thus external consultancy was important for the decision making. It is thus important to consider the role of forest officers in NIPF owners' decision making processes, as them being a highly influential factor providing information and alternatives to the owners so that they are able to achieve a broad range of objectives and goals.

The overall trust in forest experts and the scientific community will be crucial for the way NIPF owners will act on advices concerning risk management in forestry (Blennow, 2008), in addition the social and cultural context NIPF owners do belong to will influence their risk perception and decision making. Similarly, Hujala & Tikkanen (2008) stresses the importance of a well-functioning communication and trust in the forest officers in NIPF owners' decision making. A sense of fellowship between the two actors, sufficient time and space combined with face-to-face advising and consultation seems to be important factors for successful communication. The informants in the same study were found to be self-directive in their obtaining of more general information concerning forest management and timber trading. For more specific questions and decisions though, they were seeking profound and socially reliable consultancy from a forest officer known for his/her helpfulness. Informal communication between the forest advisor and the forest owner is crucial for generation of trust and commitment due to the build up feeling of fellowship, as well as positive experiences from previous contact with forest officers (Hujala & Tikkanen, 2008; Guillén et al, 2015). In addition, NIPF owners in a local case study appreciated continuity of personnel, high competence and capability and forest officers

holding a holistic view including other objectives than just timber production (Guillén et al, 2015).

In summary, there is a list of decisions a NIPF owner has to make concerning forest management and the most common decisions are related to harvesting and regeneration of harvested sites. Questions concerning harvesting are first of all whether to harvest or not, then size of the area to harvest and harvesting methods for example. These are decisions usually thought about for a long time period. Several factors which are illustrated in figure 1 will influence these decisions and the factors will have different level of impact for each forest owner. The household situation for instance; a bigger investment might require harvesting, a generational renewal might be ongoing which many times is preceded or associated with harvesting. And depending on the current situation, influences from timber buyers for instance, will have more or less impact on the harvesting decision. Personal values and beliefs will to some extent influence the management of the forest, i.e. if the forest owner highly value nature conservation before maximised timber production.

After harvesting decisions are done, the following decisions are related to the regeneration and similarly there are several factors influencing this decision. Not only the forest owners' individual goals and objectives but also external influences from forest officers for instance, combined with the overall knowledge about different alternatives. Tradition and previous patterns of behaviour might have great impacts on the decisions. Value uncertainty for instance will make it harder to make rational decisions aiming to fulfil individual goals and objectives. Forest officers have an important role to play here when supporting forest owners in their planning of the forest, providing information and different alternatives. In an ordinary situation, planning and decisions are usually made without time limit and with possibility to carefully consider different alternatives and influences.

The squared boxes in figure 1 illustrates examples of influencing factors which can have varying impact on the decision making process. Important to consider is that if an unpredicted event occurs, such as the storm 2005, one or several of the influencing factors might be altered.

For instance;

- Availability and quality of plant material might change due to higher demand
- A crisis might result in a change of behaviour; more careful acting, rethinking of previous activities, e.g. increased considering of future risks etc.
- The financial situation might be altered after a severe hazard, resulting in limited alternatives
- Recommendations from forest officers might change after such event, which in turn might affect the final decision, i.e. how forest officers frame a severe event as the storm and how they consider risk management in forestry.
- Subsidies might be available which in turn can influence the tree species choice

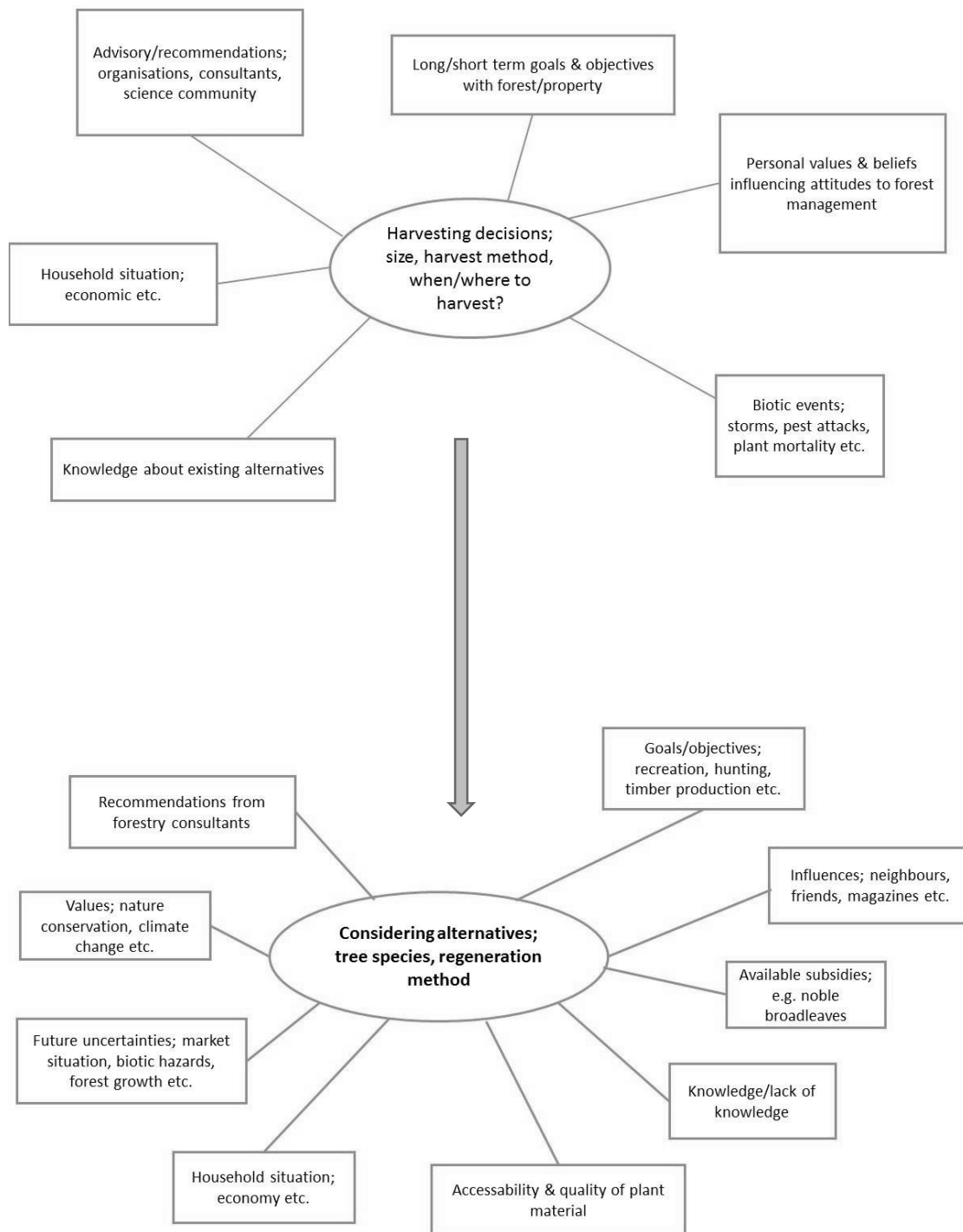


Figure 1. A common decision making process of a NIPF owner concerning harvesting and regeneration decisions. Upper figure concerns harvesting, lower regeneration. The squared boxes illustrates factors influencing the decisions.

3. Material and methods

3.1 Interview study

The study was conducted through qualitative semi-structured interviews (Troost, 2010). Participating in the study were NIPF owners in southern Sweden affected by the storm Gudrun which had used subsidies to regenerate with hybrid-aspen or poplar. Sampling of the informants for this study was made from participating forest owners in a previous study from 2010 by Övergaard et.al. (2011). Övergaard et al investigated forest owners who got affected by the storm 2005 and used subsidies to re-establish with hybrid aspen or poplar, but was mainly focused on the actual planting and seedling survival (Övergaard et al, 2011). The stands were established between 2007 and 2009 and during the summer of 2010 a selection of the stands were inventoried and a quantitative study was also conducted among the forest owners who were asked to fill out a questionnaire. In the report of the study from 2010 the forest owners were categorized into five different categories based on their specified reasons for establishment of hybrid aspen and/or poplar after Gudrun. Several of the forest owners stated more than one factor for the choice which made it a little difficult to categorize them, 24 of the 64 owners who answered the question why they had choose hybrid aspen or poplars gave at least two reasons for the choice, for example both production and broadleaves. The five categories for establishment of hybrid aspen or poplars stand were *production, on recommendation, aesthetic reasons, broadleaves* and *risk spreading*.

In total eleven forest owners were contacted via telephone. Finally, nine of them agreed on participating in the study and after they had agreed to participate in the study, an information letter and an interview guide were sent by email. The informants were chosen with respect to the category which they were divided into from the previous study. The interview was initiated with some general information about the forest owner/owners and their forest estate. The rest of the interview was structured by an interview guide containing questions aiming to answer the research questions. The questions were clearly defined and focused on the aim with the study but at the same time open in such way that the informant had a possibility to express own reflections and values.

Through qualitative interviews this study aimed at getting a deeper understanding and view of the factors which influenced them in their decision making concerning tree species after the storm. The interviews lasted around 60 min and were done in the forest owner's homes, with the intention to make them feel comfortable. In most of the cases the relevant stands were also visited in relation to the interview. The author of this thesis conducted a majority of the interviews alone, during one interview one of the supervisors participated and during another one a fellow student from SLU participated. The informants were only sampled with aspect to the five categories with their stated reasons for choosing fast growing broadleaves, stated from the study from 2010. Other factors such as gender, age, forest knowledge, if the owner lives on the estate or not, how important forest incomes are for the household economy etc. have not been considered in the sampling of informants. As NIPF owners in Sweden are a heterogeneous group this is important to remember when analysing the results

All of the interviewed forest owners had their forest property located either in Halland or Kronoberg counties, areas which were strongly affected by the storm Gudrun in 2004. Common for all the forest owners in the study was that they all lived on family farms which had been in the family between 50 and over 300 years. They all had a great interest in their forests and the management of them and conducted a lot of the work themselves. For most of them the forest was not the main income but an important complement to other incomes or pension, though for the bigger estates the forest incomes tended to be more important in total compared with the smaller ones.

3.2 Data analysis

All interviews were transcribed and read through several times, aiming to create an overall picture of the answers. The themes in the result part was created with aspect to what was experienced as important and relevant for answering the research questions as well as representative for the informants' answers. The decision making process leading up to the result of planting hybrid aspen or poplar after the storm was an important foci of the study, including influences to the decision. The subsidies available to support forest owners with the replantation was an important part, since the informants also were chosen primarily on the criteria that they had used subsidies for establishment of hybrid aspen or poplars. Another important aspect in the analysing part was the motivation for choosing an alternative tree species. What alternatives did the decision maker consider and how did the informants find information about the tree species. Every theme in the result part is built upon quotations from the informants and the informants are identified as FO1-FO9.

3.3 Ethical considerations

Before the interview all informants received a letter where they were informed about the study; the purpose with the study, my role as a student, the researchers involved and the informants' contribution to the study was declared. In the letter it was also proclaimed that the study was conducted in accordance with the EUs' guidelines for ethical research (Codex, 2015). They were informed about the voluntary choice they had to participate in the study as well as that they were free to whenever stop their participation without explanations or further questions being asked. The informants were assured total anonymity.

Table 1. Information about the forest owners, the property and the establishment of fast growing broadleaves after the storm. The last two columns shows the share of fast growing broadleaves planted of the total plantation made after Gudrun and the share of the total forest area.

Forest owner	Years in family	Owner	Productive forest, ha	Area planted, ha	Hybrid aspen/poplar, ha	Rest planted with	Fast growing/Total planted	Fast growing/Forest area
1	> 130 years	2 brothers	150	40	0.5	Spruce	1.3 %	0.3 %
2	>300 years	Wife+husband	102	6	2	Spruce	33.3 %	2.0 %
3	75 years	Wife+husband	29	15	1.5	Spruce & natural regeneration	10.0 %	5.2 %
4	200 years	Wife+husband	41	4	1.5	Spruce	37.5 %	3.7 %
5	> 100 years	Male	56	30	1.3	1 ha larch, 1 ha Sitka spruce, rest spruce	4.3 %	2.3 %
6	100 years	Wife+husband	43	7	2	Spruce	28.6 %	4.7 %
7	> 100 years	Wife+husband	85	6	1	Natural regeneration	16.7 %	1.2 %
8	>100 years	Wife+husband	270	7	1.4	Spruce + natural regeneration	20.0 %	0.5 %
9	>50 years	Male	570	30	6	Spruce	20.0 %	1.1 %

4. Results

4.1 Prevailing values in forest management

4.1.1 General attitudes

Common for all the informants in the study was that they all highly valued being a forest owner and expressed a genuine interest for their forests and the management of the same. All of them conducted some of the management themselves, such as cleaning, planting and taking out small amounts of wind fallen timber. The informants valued having a well-managed forest with developed road network, to enjoy walking in ones' own forest, picking mushrooms and berries, the forest was also a place for exercise by doing the work load oneself. Several of the informants expressed that they were managing a heritage for future generations, and thus wanted to increase the value of the estate by increasing the standing volume or simply by passing on forests able to be harvested in the future.

"We manage it for our children, if it is our own children or someone else taking over does not matter. It is for future generations" FO8

The forest owners had a varying background; several of them had grown up on the farm which had been in the family for generations, whilst others had moved there after taking over the farm. Also the level of forest knowledge varied among the informants, some had been working in the forest since being a little child whilst others had moved there after taking over from parents or parents in law, with very limited knowledge about forestry.

"I had no forest background whatsoever before we took over [...] learnt from my father in law [...] I'm curious, interested and rational, in one way or another it has worked out" FO4

A majority of the informants had other incomes despite the ones from the forest and did not consider the incomes from the forest as very important. Instead they mentioned it as an important complement to the household economy as well as future pensions or heritage for the children.

4.1.2 The storm as a mind shifting influence

All of the informants had experienced economic losses at varying levels due to the storm felled forest. Several of them had large savings in their forests and even if their main incomes did not come from the forestry it was still an important complement to their overall household income or savings for future pensions or heritage for their children. Several of the informants had managed their forests carefully for a long time and had strong emotional ties to it and thus it was hard to see it get ruined over just one night. Powerlessness against the strong forces of the storm was expressed.

"Wife: I estimate the losses to millions SEK. But it was the same for everyone, it was a nice and old forest here before. It is the only time I've seen him (husband) cry. Husband: Yes it was hard" FO6

Even if the informants were affected in some way by the storm, they had varying views and analyses of the event. Some mentioned the sensitive spruce forests as an important factor for the great damages and were convinced that a change in the tree species composition would be necessary in the future.

“I started to look for alternative tree species, I thought ok here we are now in this situation where everything has blown down during one night, and the bark beetle attacks [...] the thought was to decrease the risks for the future [...] either you continue with this spruce forest and you know it will blow down again since you already have experienced it, or you try an alternative” FO5

Not only the choice of tree species but also how to manage the forests to avoid future wind damages was discussed. Several of the informants mentioned a changed perspective on thinning and the importance of allowing some proportions of broadleaves in the stands.

“Before the storm one followed the production recommendations strictly. We no longer perform late second thinning. When the height is about 18-19 meters, there will be no more thinnings” FO3

But the magnitude of the storm was also viewed as something extra and above the normal. It was expressed during the interviews that when storms like Gudrun happen, the management of the forests doesn't matter because that wind level will break almost everything anyway.

“Storms will occur also in the future. This was a 100-years storm, so I don't have to experience the next one” FO7

What the informants had most in common after the storm was that they all felt a strong will to fast get a standing forest again on the damaged sites. And to establish something that would grow fast and that one could personally enjoy the result of. Establishment of fast growing broadleaves with a short rotation period would mean a fair chance to see the result of the regeneration during one's own life time.

“What attracted was primarily the short rotation, to be able to see something from the beginning to the end during my life time [...] a reasonable chance for me to harvest it myself, that was cool, and at the same time they (hybrid aspen) means high growth” FO4

4.1.3 The role of subsidies for choosing fast growing broadleaves

Several of the informants mentioned the situation after the storm as a unique chance to try something new. Here, the subsidies available from SFA for re-establishment of forest did play an important role in the informants' choice of planting hybrid aspen or poplars.

The majority of the informants answered that they would not or probably not have planted hybrid aspen or poplars without the subsidies due to these species requiring fencing and thus resulting in higher establishment costs.

“We would not have done it without the subsidies, it would have been too expensive. Then we would have to harvest forest to finance the establishment and we did not want that” FO8

Overall the informants experienced SFA as very active in their efforts after the storm, both informing them about the subsidies and trying to influence them in their tree species choice. In many cases the informants had raised a wish to try alternative species and SFA then suggested hybrid aspen.

After the storm SFA visited forest owners who had got their forests damaged and discussed alternatives for the future. The interest for the subsidies from forest owners was not as high as expected and the criteria for applying changed during the application period, from a minimum of 2 hectares to 1 hectare. It was expressed during the interviews that employees at SFA really wanted the forest owners to use the subsidies available for re-planting the damaged sites with alternative tree species.

“They had problems getting rid of all the subsidies, they were almost pushing you to apply” FO3

One of the interviewees got support with the applications for the subsidies from the timber buying company who also took care of the fallen timber after the storm.

The forest owners used the subsidies, often on recommendation from SFA, to try something new on a relative small area, most of the areas planted with hybrid aspen or poplars were between 1-2 hectares. The rest of the storm damaged areas were planted with mainly spruce, some small areas with larch or Sitka spruce.

“No I don’t think I would have, without the subsidies I would have had to plant spruce again” FO6

Only one of the forest owners planted on a bigger area, about 6 hectares and that was done on a much bigger estate compared to the other ones in the study. The share of fast growing broadleaves planted after the storm was 20 % and it was 1 % of the total forest area on the estate.

One of the informants expressed it probably would have been a plantation of hybrid aspen someday even without the subsidies. It was something already thought about for a long time and the storm together with the subsidies was a suitable possibility

“The subsidies did not make the decision harder so to say, there is a chance I would have planted hybrid aspen someday anyway but the subsidy was a lucky circumstance at this moment” FO4

4.1.4 Influences and alternatives in the decision making

The informants mentioned varying factors influencing them in their idea to plant fast growing broadleaves; they had seen stands of hybrid aspen and poplars and were impressed by the growth and the look of the stands, they had been reading about the species in Swedish forest magazines such as Land, Skogen and ATL, or as in several of the cases they had discussed with employees at SFA after the storm about which species to choose. The idea of being unique by planting an alternative tree species was brought up during the interviews. To have something no one else had.

“They had a fenced area with a plantation of hybrid aspen, and I was there looking at it at several occasions. We looked at it together and I saw how well it was growing and thought it could be interesting to try something like that here” FO8

Some of the informants had already decided to plant fast growing broadleaves; either hybrid aspen or poplars and just used SFA to confirm the location and suitability of the area thought for the establishment. Others were discussing the tree species choice with SFA after the storm, and for example mentioned they wanted to use something else than spruce, in many cases deciduous trees were preferred for the re-planting.

Several of the informants had been thinking of new alternatives and were open for other tree species for establishment on the estate. One of them had except hybrid aspen re-planted with larch, Sitka spruce and Norway spruce but expressed a regret of not choosing larger areas for planting of other tree species than spruce.

“If it had happened today I would have chosen larger areas for other species, you did not know then, at the same time the opportunity was there at that moment and I thought at least I could do something else[...] today I can regret I did not plant more of other tree species” FO5

Also other tree species were mentioned as possible alternatives for the establishment; alder, beech, Douglas fir, larch, wild cherry. But the decision of hybrid aspen or poplars was in many cases based on the potential growth of the species.

“To choose hybrid aspen was not obvious, there were several species to choose from, SFA visited and did an inspection of the site before, it was necessary to achieve the subsidies. They reasoned about the suitability of the site, soil conditions etc. Beech might have been an option [...] but wanted something that comes naturally the second generation and that grows fast” FO3

Some of the informants had planted other tree species, larch for instance, previously after recommendation from SFA. And one of the forest owners had used subsidies before with help from SFA for establishment of a beech stand.

“We have applied for subsidies before through SFA, for a regeneration of beech, 3 hectares that similarly required fencing” FO2

4.2 Forest owner's attitudes to fast growing broadleaves

4.2.1 Moving away from spruce

After seeing the great amounts of spruce falling down during the storm, there was a concern about planting spruce again. Planting something else, especially broadleaves, was a way of spreading the risk and an attempt to avoid storm damages in the future, and for the informants, hybrid aspen appeared as a good alternative.

Several of the informants experienced the increasing plantations of spruce which had been ongoing for decades in the region, as problematic. They mentioned several factors influencing the plantation of spruce, for instance the problems with regeneration of pine in the area. A majority of the informants were aware of the decreasing proportion of pine in these areas, some influenced by the public debate and ongoing research of the topic. Several were hunters themselves and witnessed about too large moose populations resulting in difficulties for pine regeneration. However, it was a general wish among the informants to see an increase of pine regeneration. Several of the interviewees had started to regenerate with pine, and by using chemical treatment to avoid browsing damages, it was possible to achieve a successful regeneration without fencing

"Since about the end of the 1950's, no pine has been planted here, except the small amounts we have planted now [...] from now on we are going to plant pine where the soil is suitable, where spruce is standing now" FO8

Södra was also mentioned as an influencing factor to the increasing spruce plantations, due to their pulp mills demanding big quantities of pulp wood. One informant expressed it as some of their forest officers were only spruce focused and had experienced resistance to establishment of other tree species than spruce. It had in some cases resulted in a negative feeling towards the organization due to the fact that the informant wished to prioritize other objectives than production of spruce timber, for instance recreation and wanted to increase the proportion of deciduous trees.

"It was only spruce [...] they needed spruce for their pulp mills [...] but that is changing, the demand for pulp is decreasing" FO2

It was mentioned that the increased spruce plantations had led to spruce being planted on improper soils, many times sites more suitable for pine or deciduous trees. Informants stressed these spruce stands being more prone to both root rot and wind damages. In addition the recreational value in these forests decreased, especially for forest owners enjoying picking mushrooms and berries.

"A lot of spruce has been planted on unsuitable sites here, it has resulted in problems with root rot and thus there is no economy anyway. We don't think it's a nice experience walking in those spruce plantations, we like picking mushrooms and berries and that is what we have in mind when we regenerate now" FO2

Another informant expressed it as there was an existing distinction of generations concerning tree species choice. To just mention other tree species than spruce for older forest owners was a difficult thing and sometimes resulted in being marked as a crazy person when suggesting the establishment of something different than spruce.

4.2.2 Increased proportion of broadleaves due to aesthetic reasons

Overall the informants did not have any specific economic expectations on the established stands of fast growing broadleaves. One of the reasons was instead the chance to increase the amount of broadleaves on the estate for other reasons. Both aspen and poplars were expected to change the approach of the forests on the estate, to increase the recreational and aesthetic values.

“It is a lot of life in an aspen forest, doesn’t matter if it is the native one or hybrid aspen, the way the leaves are moving during summertime, it is always beautiful. That sound doesn’t exist in a spruce forest” FO1

“It is something with these aspen forests, not so much ground vegetation, a lot of leafs falling [...] exciting environment for hunting [...] fascinating environment those aspen forests” FO3

Several of the informants had chosen the site where hybrid aspen or poplars were planted with aspect to the surroundings and the possibility for others to enjoy a stand with deciduous trees.

“It was a ridge where it blew down the most. I got the idea it would be a shame to plant a lot of dense spruce by there by the house. It was an opportunity, I thought it would be better to plant broadleaves there, and eventually I decided to plant hybrid aspen, it could be fun to try” FO8

One of the forest owners had a stand previously consisting of spruce of Romanian origin which was severely damaged during the storm. They were not satisfied with the appearance of that stand before the storm and saw a possibility to make a change when it blew down and there were subsidies to use for planting alternative tree species.

At the same time there was also a wish to increase the overall proportion of broadleaves on the property, and the family found it suitable to place a broadleaved stand where other could enjoy it instead of in the middle of the rest of the forests where few people would be able to see it.

“Three houses have insight to this stand [...] we wanted to be nice to the neighbours by establish broadleaves there” FO1

Others established the stand with hybrid aspen or poplars close to the road, where they both themselves and other could enjoy the stand while driving by. One of the informants expressed a wish to establish a stand of hybrid aspen in closer to the house or the road to be able to enjoy it themselves.

4.3 Information and consultation

4.3.1 Swedish forest agency (SFA)

A majority of the informants expressed positive opinions of SFA as an important and reliable actor for forest owners in southern Sweden. SFA managed all the subsidies available for the forest owners after the storm. They were out visiting forest owners with forests damaged by Gudrun, informed them about the subsidies, gave consultation and recommendations and approved the site and the fence. Forest officers at SFA were in several cases the one recommending forest owners to plant fast growing broadleaves, especially hybrid aspen.

“We were discussing together, we wanted to plant broadleaves [...] he (forest officer at SFA) suggested this, that we could do this. He was also out looking at the site before we started” FO1

“Forest officer at SFA suggested hybrid aspen, a good alternative [...] SFA was out visiting and looking at the site after the storm” FO8

The closeness and level of informality in the relation between SFA and the informant, was varying. Some of the informants had quite close friends working at SFA, whom had planted hybrid aspen themselves and thereafter served as an inspiration source. Examples were also given of forest officers working within the same area for a long time and thus being well known among forest owners and having a continuous and trustful relationship with the same. In these cases the forest owners expressed having high levels of trust and reliability in SFA as forest consultants. The respondents were asked if there is any certain person or organization in which they have high trust regarding forest advisory.

“SFA is such one [...] my father used to be in contact with an older man at SFA and when he retired another one replaced him so now we turn to him” FO3

Some of the informants already knew about the subsidies available for re-planting before the visit from SFA, whilst others were informed during the visit. One of the informants mentioned receiving information sent out from SFA about the subsidies. In many of the cases the informants had already thought of and decided to try something else than spruce, preferably deciduous species.

Hybrid aspen or poplar was already an existing alternative for some of the informants before and these ideas and thoughts were then received by SFA who recommended hybrid aspen as a suitable alternative. No one of the informants mentioned being recommended by SFA to plant poplars. Only one of the forest owners in this study planted poplars and it was expressed being done without influence from SFA. The demand for the subsidies wasn't as high as SFA had hoped for and the requirement changed from a minimum of 2 hectares to 1 hectare with the intention to get more forest owners to re-plant with broadleaves.

“A forest officer at SFA informed us about the subsidies, though they changed the rules for applying. Not so many applied so when they changed the rules we could go for it” FO1

The location and size of the area planted with hybrid aspen or poplars was decided after consultation with SFA. Some of the informants mentioned having a specific location for the establishment in mind, and the area was visited by SFA and the suitability discussed with the forest owners. The size was in some cases adjusted after an inventory by SFA. For instance parts of the area were found not suitable for these species, e.g. being too wet or too frost prone. Sometimes the area in the end became smaller than the first thought. No one of the informants mentioned SFA trying to influence or recommending them to plant hybrid aspen or poplars on larger areas. The planting of hybrid aspen or poplars after the storm was an experiment, the expectations on the economic aspect wasn't high.

4.3.2 The Southern Forest Owners' Association (Södra)

Södra was mentioned as another important and influencing actor for NIPF owners in southern Sweden and had for several of the informants been so for a long time. For several of the informants the membership had run within the family for generations and Södra was associated with stability and being an important actor for the forest sector in Sweden. Though, for some, being a member of Södra had not always been obvious, for instance, the storm or having a neighbour or friend working at Södra could be a reason to become a member. The membership also seemed to something regional, spreading among neighbours and friends. Only one respondent was not a member and referred to this.

"Not member in Södra, never been [...] not so many are Södra members around here. It is a regional thing, it is like it is spreading" FO3

In the direct aftermath of the storm Gudrun, Södra did a great and important job helping their members out by taking care of the timber and trying to give the forest owners the highest timber prices possible in this very precarious situation. Not being a member when the storm hit, was by one informant mentioned as an unpleasant experience. Several of the informants mentioned the advantage of being member of such a strong actor when thousands of cubic meters had to be taken care of, Södra was someone to rely on.

"My experience is that Södra has been good all the time [...] for instance after the storm, the members were prioritized" FO6

Negative opinions about the organization were also raised during the interviews. One of the informants expressed a worry that Södra no longer in first hand prioritized the interest of the individual members. The reason for this opinion was due to the major transformation Södra has done when taking further steps into the industry, today owning and running several saw and pulp mills. Also Södras' activities in other countries were mentioned as being disfavouring for the members of the organization. For instance, investing in foreign industries with the risk of losing money and the buying of raw material from the Baltics.

"They are not a members association today, they are an incorporated company [...] and such a company does not favour us members fully. They are supposed to favour me and my forest" FO7

For one informant, Södra was viewed as a reliable and trustworthy organization, resulting in their consultancy and advisory regarding forestry having strong influence on decisions concerning the forest management. The same informant expressed a wish to increase the amount of broadleaves and put high value on recreation and had experienced problems when discussing this with forest officers at Södra. For instance, expressing a wish to plant something else than spruce could meet strong resistance. In addition with a feeling that they know better it often ended up with the result of continue planting spruce. The same informant had experienced lack of consultancy and information about management of broadleaves from Södra.

"You are quite influenced by those forest consultants, what they think, and you get the feeling that they know better and follow their advices...we discussed planting hybrid aspen with Södra, and I know he doesn't like broadleaves, they just said well it is your choice" FO2

Being a member in the organization did not mean the forest owners only used Södra as a source of information, to sell their timber or for consultancy. In many cases, it seems to be a bitter sweet relationship between the forest owner and Södra, meaning that, despite having strong, negative opinions about Södra's activities and consultancy, the membership is still too important to give up. The thought of ending the membership did exist for some of the informants, but the advantages, such as a reliable capital investment, an organization to rely on during hard times and a useful information source, seem to outweigh the negative parts.

"Today we deliver our timber to private sawmills, but we are still passive members in Södra [...] we have some capital invested with quite good return" FO1

Furthermore, some of the informants expressed a decrease of Södra's physical presence out in the field meeting the forest owners.

"Södra used to be good at being out among the members, now they are sitting at the office waiting for emails" FO8

4.3.3 Information sources

Several sources for information about the forests and the management of them were mentioned; friends, neighbours, SFA, Södra, Sydved and magazines such as Land, Skogen, ATL, Skogsland, Skogseko, Södras' and Vidas' own magazines as well as the web. No specific web pages were mentioned. One informant had been joining workshops with other friends aiming to increase their knowledge level about forestry.

"It is a network of contacts that we have [...] timber buyers at sawmills and one at Södra I know personally, neighbour and friends, SFA, no one specific. Everyone has something positive to contribute with" FO1

There were varying opinions of the information available of establishment and management of hybrid aspen and poplars. Common for the informants was that none of them were complete sure of how the management of the stands would be for the whole rotation period. Some of them mentioned the lack of knowledge and information available as a

problem whilst other had the attitude that there is never any problems related to the searching and finding of information.

“I can always find information about anything [...] I never experience problem with finding information about it (management of hybrid aspen) [...] there is good information about different tree species, on the web, even think SFA has a lot of information about it” FO5

Some of the informants had already discussed the management of the stand for the nearest future with forest officers at SFA. In other cases the next step in the management of the stand was not decided, but there was no uncertainties about finding information in the future, they could contact Södra or SFA for help for instance, or look at their web pages.

4.4. Problems associated to the establishment and management

Overall, the establishments of hybrid aspen and poplars after the storm were experienced as successful by the informants. All but one of the forest owners now had a stand consisting mainly of hybrid aspen or poplars with elements of birch, pine and rowan. In one case all the hybrid aspen plants had died approximately three years after the establishment and the reasons for this was still unclear. The owners' own explanation was a combination of bad plant quality, bad planting and maybe frost and/or drought. However, since the major reason for planting for this forest owner was to increase the share of broadleaves on the estate and to create more storm prone forests, the owner was happy about the mixed stand of pine, rowan, beech and birch coming up within the fence. To see species which are usually hard to regenerate due to heavy browsing, such as pine and rowan, now being able to establish within the fence, was expressed as something positive by several of the informants.

“There will be a mixed forest with majority of birch and rowan [...] it is what it is, there were no aspen but we will have a nice forest anyway. It would have been worse if there was nothing” FO5

Another experienced problem was a gap between the delivery of the hybrid aspen plants and the installation of the fence. The forest owner got the advice from the supplier to plant anyway, even if the fence would be set up one week later than the plantation. This resulted in severe browsing damages by moose. The same forest owner had planted hybrid aspen with some expectations to produce timber for matches and now doubted that the quality of the trees would be sufficient for that purpose.

Gaps and unevenness had occurred in several stands due to plant mortality and the owners explained this being due to the site being too dry or too wet. In some cases where the result was like that, SFA had given recommendations not to plant at a certain area due to unsuitable conditions, in another case the site was considered good enough. But overall mortality of the plants of fast growing broadleaves in the stand did not appear as a great problem for the forest owners. They were satisfied with other species complementing the plantation of hybrid aspen or poplars. Several of the forest owners mentioned being interested in managing the stand of hybrid aspen for timber production, even if it was not

the primary goal. Instead what seemed to be important in the end was that there would be a beautiful deciduous stand, independent of the species within the stand.

“Where the hybrid aspen is not growing so good, we save birch, and it looks nice [...] some pine is coming also, and we’ll let it be in case there is nothing else growing there” FO2

Browsing damages caused by moose was a fact, despite the fencing. Forest owners had witnessed moose jumping over or pushing down the fence to be able to get in to the plantation, leaving varying levels of damage behind. Vole damages were also occurring, though not as severe as moose damages. In general the informants were satisfied with the plant supply. Södra was the main supplier of hybrid aspen and poplar plants for the plantations, some of the informants ordered from Svenska skogsplantor and other smaller companies.

Size of hybrid-aspen plants varied between 10 and 90 cm, with average somewhere around 50-60 cm. Poplar plants were, about 1 meter high. One forest owner had experienced plants with really low quality, only about 10 cm height. They were delivered by Södra and when the forest owner directly questioned the size of the plants he/she got the response that it was sufficient. After some years they were compensated with new plants when the old ones were considered to be dead. In the end, the result was double planting as the old plants eventually started to grow.

What to do with the fence in the future was a problem expressed among the forest owners. There were varying opinions regarding how long to keep the fence in order to avoid browsing damages on the trees. Some of them wanted to keep the fence to let other species such as rowan and pine establish within the stand.

The development and future of the stand seemed uncertain for several of the informants. There was an awareness of hybrid aspen and poplars being relative new tree species in Sweden, resulting in a shortage of knowledge and experience compared to establishment and management of spruce for instance. In addition, the fact that they are hybrids and invasive, resulted in some concern of possible effects related to establishment of the species, with reference to the establishment of Lodgepole pine (*Pinus contorta*) in northern Sweden. One of the informants had read a critical article about invasive species and expressed worry about this.

“It is interesting to read about how they oppose to hybrid aspen, that it is modified [...] it feels like it is a research centre here now” FO6

Overall the management of hybrid aspen and poplars did not appear as problematic for the forest owners, however some concerns were raised during the interviews. For instance, the work load required for management of hybrid aspen was expected to be higher compared with spruce management. And this was mentioned as being an influencing factor for not planting more hybrid aspen.

“Unfortunately it feels a more work demanding (compared to spruce) [...] cleaning, thinning, shorter intervals, and if you don’t manage it, it will be nothing [...] the spruce is not as fast”
FO1

5. Discussion

5.1 Influencing factors in tree species choice

One important difference between the situation that occurred after the storm, see figure 2 above, and ordinary situations, as illustrated in figure 1, was that the areas in need of replantation occurred suddenly. Usually the forest owner starts to plan for regeneration already before the harvesting starts and thus have plenty of time to consider different alternatives and factors which might influence tree species choice and regeneration method for instance, see figure 1. This was not possible in the same way after the storm which forced the forest owners to make decisions under time and many times economic pressure. Lidskog & Sjödin (2014) stresses that many forest owners had to deal with several important things in the direct aftermath of the storm, such as how to take care of the fallen timber and consider which tree species to choose was thus for many not the most important question.

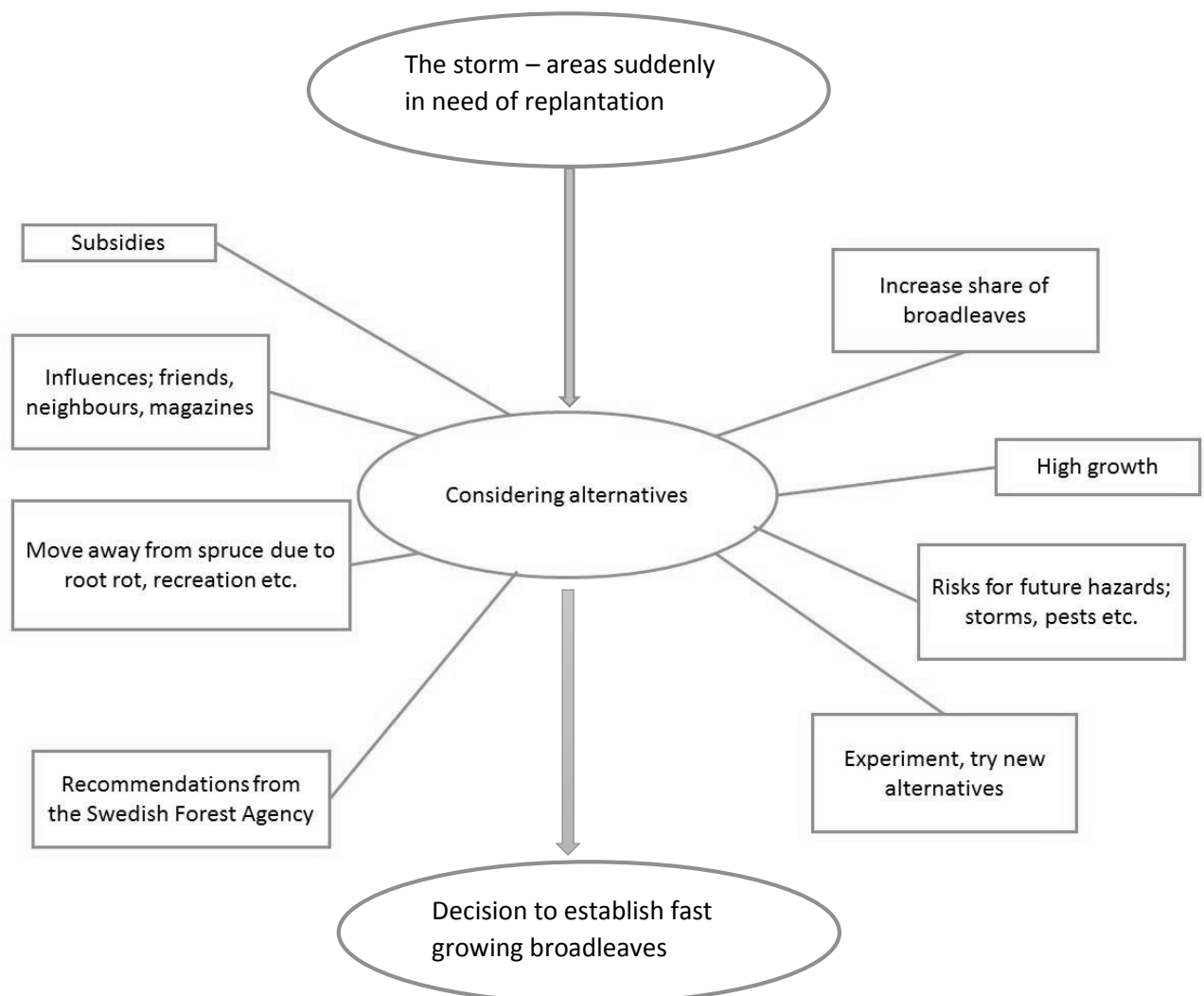


Figure 2. The decision making process leading up to the informants' choice to plant hybrid aspen or poplar after the storm 2005. Squared boxes illustrates the main influencing factors for the decision.

The results of this study points at several influencing factors, specific for the time period after the storm, leading up to the decision of planting fast growing broadleaves, illustrated in the squared boxes in figure 2. The subsidies available after the storm, were one of the strongest influencing factors for the decision, see figure 2. All but one of the informants stated that they should not have established a fence without subsidies due to the higher costs. Subsidies were though available for all kinds of tree species, including spruce. After the storm, spruce plantations were considered as the greatest risk for future storms and the idea was that this knowledge together with the subsidies would make forest owners choose other tree species than spruce.

However, as there were subsidies also for planting spruce again there were in fact no economic advantage for choosing alternative species compared to planting spruce and it is possible that this made it easier for forest owners to choose spruce for re-establishment again. SFA wanted forest owners to take risk reducing actions by choosing other tree species than spruce for the establishment after Gudrun, but was that the conception SFA passed on to forest owners when the cost for planting spruce again was the same as for other tree species? With the subsidies for planting spruce, maybe the risks associated with spruce plantations did not appear that great. In addition, a severe event as the storm with such great damages in the forests, might have resulted in a more careful acting among forest owners, i.e. the subsidies made it possible to try something alternative on a small spot but spruce was still the safe card to rely on.

NIPF owners are often influenced by forestry consultants to some extent when making decisions, see figure 1, but the difference between ordinary situations and the situation after the storm was that forest officers at SFA had much greater influence in the forest owners' tree species choice, and recommendations from them were mentioned as an influencing factor for choosing fast growing broadleaves, see figure 2. The situation was unusual in that way that SFA had a clear goal to influence forest owners in their tree species choice and made special efforts to do so. They spent time with the forest owners out in the field, discussed with them and listened to their thoughts and ideas. Hence, when forest owners expressed a wish to plant broadleaves, there was a forest officer there to support this decision and to give consultation. It is possible that these efforts played an important role in the forest owners' choice to take the risk and plant alternative tree species. Previous research points at the importance of face-to-face communication between the forest owner and the advisor and a build-up of trust and a sense of fellowship for a smooth communication (Hujala & Tikkanen, 2008). NIPF owners appreciate forestry consultants with a broader view than only maximising of timber production as well as informal relations (Guillén et al, 2015).

SFA had a quite ambitious goal for establishment of other tree species but it was by far not met. It might be that they was expecting another result due to the fact that spruce plantations had started to be questioned and viewed as a risk for the future. But in fact 95 % of all the damaged sites after Gudrun were replanted with spruce again. Informants in this study also expressed risk spreading as a factor for choosing fast growing broadleaves when replanting after Gudrun, see figure 2. The fact was however that several of the informants planted spruce again, and that the areas replanted with fast growing broadleaves many

times accounted for just a small share of the total area planted, see table 1. Choosing another tree species was thus considered a greater risk than continuing with spruce for the informants.

Lidskog & Sjödin (2014) studied why forest owners in fact continued to plant spruce again after the storm despite the changed recommendations together with their awareness of the risk associated with spruce plantations. They concluded that forest owners were aware of the risk of planting spruce again and that establishment of alternative tree species, especially broadleaves, was a way to spread the risks for future storms. However, another finding by Lidskog & Sjödin (2014) was that many forest owners considered planting of broadleaved species as an even greater risk than to continue planting spruce. Too many uncertainties were associated with alternative tree species; future market demand, suitability of soils, potential pest attacks, the work load required, higher establishment costs resulting in a total lower net. Planting spruce again simply felt like a more safe action for future incomes. This might be one important factor to consider when trying to understand the decision making process ending up with so many forest owners choosing to plant spruce again. Many forest owners were well aware of the risks and ended up with simply choosing the less risky alternative. The decision to plant fast growing broadleaves were for many of the informants simply an experiment which became possible due to the subsidies.

It is however important to remember that a majority of the informants expressed several reasons to move away from spruce, see table 2. A fear of future storm damages and experienced problems with root rot for instance. This is in accordance with conclusions from previous studies that NIPF owners have become more aware of storm risks after Gudrun (Ingemarsson et al, 2006b). In addition, several of the informants expressed a wish to increase the amount of broadleaves due to recreational and aesthetic purposes and it concludes what numerous studies have concluded; NIPF owners is a group holding a wide range of objectives. Many times their objectives are competing, e.g. timber production and recreation, maximising timber production is however for many NIPF owners not the most important one (Eggers et al, 2014; Ingemarsson et al, 2006a). Hugosson & Ingemarsson (2004) even points at a slight move towards conservation over time among NIPF owners in their study. These objectives among NIPF owners are important to catch and can be used as a good starting point for the increase of mixed or deciduous stands in the southern Swedish forests.

5.2 The role of forest advisors in tree species choice

NIPF owners in Sweden are stated to have high trust in forest officers in general. A study from 2004 reveals that more than 70 % of the interviewed NIPF owners were requesting advice and consultancy from forestry consultants at different organizations and 80 % of those had high trust in consultancy from forestry consultants (Blennow, 2008). Furthermore, studies show that 80 % of the respondents considered their forestry consultant to be competent in the field of risk management and 64 % of those were discussing risks with their consultant (Blennow, 2008). The forestry consultants thereby play an important role as an influencing factor when supporting NIPF owners in their daily decision making in forest management. Forestry consultants in Sweden do have a strong position and influences NIPF

owners both by their recommendations but probably also by their lack of recommendations and by showing a resistance against the forest owners' objectives.

Lidskog & Sjödin (2015) are talking about them as holders of epistemic authority due to the position they have achieved through their forestry education combined with the unique amount of knowledge and experience they have acquired after years working in field as forestry consultants. In addition they may be associated to a strong and trustworthy organization as Södra or SFA for instance which even reinforces their authority. Blennow (2008) points at the fact that many forestry consultants have gone through the same education within the same university which might result in them having a similar approach to forest management and risk for instance. With the same background they often share a common forestry culture and could be seen as part of a professional habitus with shared understandings and values. The role as educated forester becomes an identity which might involve a strong feeling of loyalty.

There are probably more NIPF owners who, similarly to the informants in this study, wish to increase the share of broadleaves on their estate and at the same time are aware of the risks of planting spruce, but might need a push from their forestry consultant in order to take the decision. The informants in this study had in common that they were interested and engaged forest owners who were searching and open for new alternatives and when the storm occurred they used it together with the subsidies as an opportunity to try something alternative. To reach other categories of forest owners and influence them in their decision making concerning tree species choice might demand other methods and sources of influence. Many NIPF owners use Södra and similar organizations for the creation of forest management plans and this is an important meeting where different alternatives for the forest can be discussed in accordance with the forest owners' personal goals and objectives. However, Brukas & Sallnäs (2006), stresses that this procedure varies a lot and many forest officers spends very little time with the forest owner. The risk in such cases is that the planning of the forest becomes standardized and goals such as increase the share of broadleaves or try new tree species might not be prioritized.

The Swedish Forest Agency (SFA)

Several of the informants expressed having great trust in forest officers working at SFA, especially regarding establishment and management of deciduous tree species. They also appreciated high continuity of personnel and informal relations with the staff. This is also in accordance with Guillén et al (2015) findings in a study regarding social capital where NIPF owners expressed having high trust in forest officers at SFA for the same reasons. This high trust towards forest officers at SFA is useful for implementation of policies and for promotion of changes in forestry, e.g. planting of other tree species. What could be interesting to look further into is if SFA was recommending other tree species than hybrid aspen as well, aiming to achieve more plantation of deciduous trees. Also if they tried to influence NIPF owners to establish larger areas with fast growing broadleaves, or if SFA was a bit careful as well in their role as consultant. How forestry consultants frame and understand events such as severe storms, will influence how they thereafter communicate this to forest owners as well as what they base their consultancy on. Lidskog & Sjödin (2015) concluded that forestry consultants many times in fact hesitated to recommend NIPF

owners to plant other tree species than spruce after the storm, due to the same reasons NIPF owners many times choose to plant spruce again; the strong position and tradition of spruce in southern Sweden and the uncertainties associated with other tree species without sufficient knowledge and experience.

It would be interesting to investigate the general opinions and attitudes towards establishment of alternative tree species among forestry consultants as they probably have a very influential role in many NIPF owners' decision making. This is similarly stressed by SFA in their report made after the storm when they are analysing why the total area replanted with alternative tree species, including fast growing broadleaves, was not larger (Skogsstyrelsen, 2013b). Furthermore, no one of the informants mentioned being recommended by SFA to plant poplars. Reasonable explanations to this could be that it is considered to be more suitable even more south in Sweden, i.e. the county Skåne and on former agricultural land. In addition, there is more research and information available concerning establishment and management of hybrid aspen on forest land compared with poplars.

Södra

Södra is important to analyse in this study due to the fact that it is such a large actor in the forest sector in southern Sweden, influencing many NIPF owners and thus to a large part shaping forest management. All but one of the informants were member of the organization and several of them expressed having trust in Södra and their consultants. They especially appreciated the work they did for the members in the direct aftermath of the storm and this is in accordance with results from Guillén et al (2015). However, informants had also experienced Södra as being only spruce focused and even resistant to other tree species and that it was difficult to get useful information about management of broadleaves from inspectors at Södra. Also that they were centralized and not visibly out in the field and mainly focusing on their industry and activities outside Sweden.

No one mentioned Södra recommending planting of other tree species than spruce after the storm. This can of course partly be explained by SFA was the main actor in the reestablishment part after the storm, managing the subsidies and visiting the storm damaged sites. But Södras' impact on forest owners in their daily decision making, can't be neglected due to the fact that so many NIPF owners are members in the organization and thus have some level of trust in it. It is also possible to have impact on decision makers by not giving recommendations and consultancy about other alternatives, in this case other tree species than spruce. Södra could play an important role in the efforts to increase the share of broadleaves in the southern Sweden forests and thereby create more storm prone forests and facilitate for forest owners to achieve their goals with their forests

5.3 Improved establishment and management of fast growing broadleaves

Overall the establishments of hybrid aspen and poplar went well for the informants and they were satisfied with the result. However, there were some problems that need to be considered for future establishments to be even more successful; plant mortality, browsing damages and soil properties for instance. One important finding from the study is that the

informants overall expressed having low economic expectations on the stands. Uncertainties concerning future demand for the species in addition with expected profitability were raised as well as how to manage the stand for specific purposes. It was seen more as an experiment and this could explain the many times small areas chosen for the establishment. Several of the informants wished to manage the stand for timber production, for instance by performing pruning in the stand, but expressed lack of information as a problem for doing this. Varying opinions regarding the information about establishment and management of hybrid aspen and poplar were expressed during the interviews.

These are all important aspects to consider for the species to be a reliable alternative in the future. To be able to increase and improve establishments of fast growing broadleaves on forest land forest owners need to rely on the result and several factors are influencing this; access to plants of high quality, improved knowledge about suitable sites, how to manage the stand for certain purposes and future markets for the species and a will among forest officers to increase the establishment. More research about the species might be needed as well and improved communication of the results to the forest owners. This is also stated by Engerup (2011) and Rytter et al (2011) who stresses the importance of improved knowledge about the species as well as increased plant supply and improved quality of them in order to increase the interest for the species. With greater knowledge among forest officers and improved information about the species forest owners might feel more comfortable with establishment of fast growing broadleaves. Rytter et al (2011) are recommending pruning for production of hybrid aspen timber and points at the possibility to increase the timber value by doing this. Such information needs to be easy to find for forest owners who wish to establish and manage fast growing broadleaves.

Another aspect raised was that management of hybrid aspen was associated with more work load compared to spruce production which is considered to be very easy managed. In addition, spruce production has a long tradition in Sweden with a lot of research behind the management and a well-developed industry. One can easily find several management programs for spruce plantations today and there are numerous different plant material to choose from when planting spruce. If there is a wish to increase the broadleaves plantations, joint efforts need to be made to facilitate for forest owners to establish and manage broadleaved stands. Rytter et al (2012) stresses the importance of decide the goal for the stand before the establishment to avoid unnecessary work load. For instance, if the goal is to produce timber, more intensive management is needed, whilst if the goal is bioenergy or pulp, the management program will be much simpler. Improved research together with complete information about the management is needed.

6. Conclusions and policy recommendations

One of the most important factors for the NIPF owners when choosing to plant fast growing tree species in the aftermath of the storm Gudrun was the recommendations by SFA combined with the offer of subsidies. The SFA officers spent time with forest owners out in the field discussing different alternatives before the replantation and so gained their trust. One important difference from ordinary situations was that the forest officers at SFA had as a clear goal to influence and encourage the forest owners to plant other tree species than spruce. It thus was in accordance with what several of the informants wished, to increase establishment of broadleaves on the estate.

Summarized, the factors raised by the informants for choosing hybrid aspen or poplar when re-establishing after the storm 2005 were as follows:

- A wish to move away from spruce plantations due to problems with root rot
- Spread the risks for future wind damages
- Increase the share of broadleaves on the estate for recreational and aesthetic purposes
- The fast growth making it possible to see the result
- Subsidies
- Recommendations from forest officers at SFA
- Other influences; magazines, friends, neighbours, observed stands with fast growing broadleaves

However, spruce was still the natural choice for establishment of new forest after Gudrun. The informants all replanted the storm damaged sites mainly with spruce and only a smaller proportion with fast growing broadleaved tree species. Due to the strong position of spruce in Sweden, with all the accumulated knowledge and practical experience from establishment and management of spruce stands, it is many times hard to compete with spruce in tree species choice. In addition, the economic yield from spruce plantations is perceived as relatively certain and there is abundant high quality plant material to choose among. In this study, the economic expectations on the stands of hybrid aspen or poplar were low and overall the established stands were seen more as forest management experiments.

Hence, even if several of the informants were aware of the risks with planting spruce again, choosing another tree species than spruce was considered an even greater risk associated with little experience and knowledge. For fast growing broadleaves to be a reliable alternative for NIPF owners, the overall knowledge about the species needs to be improved and also more research is needed, especially regarding establishment and management on forest land. In addition, accessibility and quality of plant material need to be improved to facilitate establishment of hybrid aspen and poplar.

In general the established stands were successful and the forest owners were satisfied. The biggest problem was unevenness in the stand due to plant mortality probably caused by a combination of bad plant quality, browsing and frost/drought. The forest owners in general

did not experience any big problems with finding information about the management of the stands even if some of them requested easier access to reliable management methods.

Following recommendations for forest officers and NIPF owners to facilitate establishment and management of fast growing broadleaves;

- Careful inspection of the site to make sure it is suitable for the species
- A proper fence must be established before the plantation starts
- Set a clear goal for the stand before the establishment, to be able to choose a suitable management program
- Make sure the plant material is of good quality

It can thus be concluded that forest owners that did plant fast growing broadleaves after the storm Gudrun in 2005 considered the risk with these alternative tree species too high for making them their first-hand choice for regeneration of the storm damaged stands. The storm thus proved to not be the mind-shifting event that theory foresaw. In the future, if there is a societal will to increase the proportion on broadleaves in southern Sweden, this risk averse behaviour has to be considered and acted upon by policy-makers. The efforts to influence NIPF owners to choose fast growing broadleaves when establishing forests need to be continued even in times not preceded by a storm, for example by continuous subsidies so that society takes on part of the risk associated with alternative tree species. Forestry consultants have an important role to play by informing the forest owners about the actual risks with both spruce and other tree species and provide different alternatives.

Recommended policy instruments for increased and improved establishment of fast growing broadleaves

- Increase the interest for fast growing broadleaves by campaigns initiated by organizations within the forest sector; highlighting of successful establishments, improved knowledge about the species among forestry consultants, subsidies for establishment of fast growing broadleaves
- SFA continuing their efforts to promote fast growing broadleaves, discussing different alternatives with forest owners and promotion of other tree species than spruce
- Increase the knowledge of fast growing broadleaves; easy access to management programs of fast growing broadleaves for different purposes (pulp, timber, bioenergy)
- Further research on fast growing broadleaves, especially production on forest land
- Improved availability and quality of plant material

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Appendix 1

Interview guide

Size of the property?

How long have you owned the property?

Do you live on the property?

Did you buy or inherited the property?

Are there more owners than you?

Do you manage/make all decisions concerning the property yourself?

Are you a member of any kind of forest owners' association or similar organization?

Please describe your property freely!

What would you say is your main purpose with your forest holding?

Please describe your long term goals with your forest property!

Does the forest mean an important income source for you and/or your family?

Do you conduct a lot of the work in the forest yourself?

Do you have a forest management plan? If yes who made it?

Is there any person/organization in which you feel confidence concerning advisory about your forest!

Do you search information about forest management yourself?

If you lack information about anything, where/to whom do you turn?

Why did you choose to plant hybrid aspen/poplar after the storm?

Do you have any previous experience of establishment and/or management of hybrid aspen/poplar?

Do you experience that there is enough information and knowledge available concerning establishment and management of hybrid aspen/poplar?

How do you feel about/experience the market for hybrid aspen/poplar?

What expectations did you have on the stand with hybrid aspen/poplar?

How affected were your forests by the storm Gudrun?

How much in total did you replant after Gudrun?

What are your thoughts concerning forest management after the storm?

Have there been any problems associated to the establishment of fast growing broadleaves?

Have you conducted any management activities within the stand?

Have you requested/recieved any advices concerning the management of the stand?

Would you consider planting hybrid aspen/poplar again?

Is there anything specific you lack to be able to feel higher grade of satisfaction in the establishment and management of hybrid aspen/poplar?

How satisfied are you with the stand?

Have you received any comments/opinions from others (neighbours, family, persons within the forest sector etc.)?